

# Local perspectives on bioterrorism

CME

CME, Part 3 of 3

Target audience: All physicians

## Learning objectives:

1. Identify the efforts being undertaken by the Parkland Health and Hospital System to prepare for bioterrorism.
2. Identify the efforts being undertaken by the Dallas-Fort Worth Hospital Council to prepare for bioterrorism.
3. Identify the efforts being undertaken by the emergency department at Baylor University Medical Center to prepare for bioterrorism.
4. Identify the efforts being undertaken by the Dallas County Medical Society to prepare for bioterrorism.

## Faculty credentials/disclosure:

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*Before beginning this activity, please read the instructions for CME on p. 333. This page also provides important information on method of physician participation, estimated time to complete the educational activity, medium used for instruction, and date of release and expiration. The quiz, evaluation form, and certification appear on pp. 333-335.*

## An approach to terrorism preparedness: Parkland Health and Hospital System

In response to growing concerns regarding domestic terrorism, the 104th Congress passed Public Law 104-201, the National Defense Authorization Act, for fiscal year 1997. In addition to providing the nation's first responders (i.e., law enforcement agencies, fire departments, emergency medical services, emergency planners, and health care personnel) with training regarding emergency response to weapons of mass effect

(WME), this legislation required that the secretary of defense develop and carry out a program for testing and improving the responses of federal, state, and local agencies to emergencies involving nuclear, biological, and chemical weapons. Federal officials determined that the first phase of this ambitious nationwide effort, known as the Domestic Preparedness Program, be concentrated in the most highly populated metropolitan areas in the USA. As such, the 120 most populated cities in the country were initially identified to receive the planning, training, and evaluative efforts of the program.

As the eighth largest population center in the USA, the city of Dallas underwent the Domestic Preparedness Program's communitywide analysis in the fall of 1997. This analysis included the resources, strengths, and shortfalls within the existing municipal services and medical community. A multidisciplinary team with representation from the areas of law enforcement (Dallas Police Department, Dallas division of the Federal Bureau of Investigation [FBI]), fire suppression and emergency medical services (Dallas Fire Department), city administration (Office of Emergency Preparedness, Department of Water and Streets), and the medical community (City of Dallas Environmental and Health Services, Dallas County Medical Examiner, Dallas County Health and Human Services, The University of Texas Southwestern Medical Center [UTSW], Parkland Health and Hospital System [PHHS]) was assembled to plan, develop, and test a citywide preparedness plan.

The development of the Dallas Metropolitan Medical Response System has taken place over a 48-month period, from July 1997 to July 2001. This process involved the cooperation and planning of over a dozen government and community agencies. Throughout this period, PHHS, in concert with the Dallas-Fort Worth Hospital Council, has actively participated in the development and implementation of medical community education and hospital facility preparations specific to these events. Despite the absence of a dedicated funding stream to defray the costs of personnel, education, medical supplies, and pharmaceuticals, PHHS has been recognized as a national model for hospital preparedness efforts. A comprehensive document entitled *Nuclear, Biological, Chemical Readiness Guidelines*, published in September 2000, details the hospital's efforts.

## DEFINING THE PROBLEM

First, PHHS officials sought to redefine and reevaluate the catchment area of its patient population and communities of

interest. This evaluation focused on the unique threats of terrorism and led to the realization that the following vulnerabilities and potential targets reside within the PHHS catchment area: north central Texas is a significant population center (5.1 million people, 20% of the population of Texas); Dallas County (880 square miles, 2 million population) is a geographically large, complex county containing the city of Dallas and 22 other suburban cities; and Dallas–Fort Worth is an extensive transportation hub (rail, air, motor freight). Moreover, the region also is home to the Comanche Peak nuclear power facility; Interstate 20, which serves as the major east-west corridor for the Waste Isolation Pilot Project; multiple federal, state, and city offices; and multiple large-venue attractions (amusement parks, sports facilities, convention complexes).

Next, PHHS evaluated the medical community and acknowledged both its role as a significant medical resource and its obligation to protect and preserve the health and well-being of the community in the event of a terrorist incident. Resources unique to PHHS that may assist in the mitigation of a terrorist event include the 940-bed county hospital; 7 community-based health clinics in addition to school-based and mobile clinics; the level I trauma and burn center; BioTel, a unified emergency medical system medical command and hospital notification center; North Texas Poison Control Center; and affiliations with UTSW and its allied health sciences school.

Following this assessment of vulnerability and resources, PHHS officials elected to devote personnel, time, and resources to develop, train, and periodically test and revise the hospital's plan for response to a terrorist event. Representatives from the departments of safety management, emergency services, infection control, pharmacy, facilities maintenance, bioengineering, and education formed a multidisciplinary team to lead this effort. The group's first task was to modify the hospital's existing disaster plan to address the unique nuances of a response to a chemical, biological, or nuclear agent exposure. Professionals from a variety of departments within PHHS and UTSW reviewed and revised disaster plans relative to these specific agents. The departments of radiology and environmental health and safety revised plans involving radioactive agents; the departments of infection control and infectious diseases revised response protocols for biological agent exposure; and emergency services, emergency medicine, and the North Texas Poison Control Center revised chemical agent exposure protocols. Key contacts, lines of communications, and treatment/isolation protocols were developed to expedite the identification, treatment, and surveillance of exposed individuals.

## DEFINING CRITICAL FUNCTIONS

In addition to updating PHHS's disaster plans, the multidisciplinary team also identified 5 critical functions for event mitigation: safety and security, decontamination, acute and definitive medical care, communications, and resource procurement and management. The activities and actions necessary in these critical functions are described briefly here. These functions may be applicable in whole or in part, depending upon the agent utilized in the terrorist attack.

## Safety and security

Since terrorists may identify health care facilities as primary or secondary targets, safety and security issues are important. Confusion and fear will be prominent among civilians, regardless of their actual involvement in the incident. This will bring unprecedented numbers of victims, concerned family members, and “worried well” to hospitals. In a WME incident, safety personnel should establish a secure perimeter around the hospital campus, controlling access to vehicle and foot traffic. This will simultaneously limit access by criminal elements and prevent contamination by the uncontrolled arrival of victims. Separate patient and employee entrances should be secured and maintained throughout the event, and a system of identification should be in place allowing hospital access to “critical-need” employees only.

Since the use of a WME is a criminal act, key information should be collected from victims. A scripted interrogation should include the time and location of the event, an estimate of the number of people involved, any unusual activities or people noticed just prior to the event, and any unusual sights, sounds, or smells just after it. Documentation of the prominent signs and symptoms experienced by those who have been exposed may aid in the early identification of the agent involved. Evidence collection (e.g., bagging of clothing samples) from victims prior to decontamination may yield clues as to the nature of the agent. Interrogation and evidence collection activities should be coordinated with local police and FBI officials. Regular security sweeps of the hospital facility should be performed looking for secondary devices, unauthorized personnel, or breaches in building access.

## Decontamination

To prevent contamination and subsequent closure of the hospital facility and to ensure the safety of personnel and currently hospitalized patients, victims of nuclear or chemical attacks will usually be triaged and undergo decontamination at a central location external to the facility. (Decontamination is rarely if ever necessary for biological agent exposure.) While decontamination activities do not require medically trained personnel, the process is overseen by medical providers who perform triage and provide stabilizing, rudimentary care as needed. Specific hospital personnel should be trained to perform decontamination activities while in appropriate personal protective equipment.

The utilization of specific decontamination techniques as it relates to individual agents (nuclear, chemical) should be based upon a combination of information from law enforcement or on-scene intelligence and medical expertise. Personnel should be able to perform gross decontamination of nonambulatory and ambulatory patients. Decontamination solutions and containment of runoff should be consistent with the community response plan and in accordance with the local water and sewer policies. Specific logistical issues should be clearly defined in the hospital response plan. This should include a system to identify and bag personal effects (valuables), tag and bag clothing (potential evidence in a WME event), and provide gender-specific changing and decontamination corridors and modesty garb. These issues should be addressed before the patient enters the health care

facility for medical treatment. A unified, strong presence from the security/safety organization will promote cooperation and efficiency in accomplishing mass decontamination.

### **Acute and definitive medical care**

Hospital personnel should be available to respond to a mass casualty incident on an “as-needed” basis. As established in the response plan, a roster system for mobilizing adequate numbers and types of manpower should be utilized. Acute care physicians and nurses (emergency medicine, surgeons, intensivists) will be most useful in addressing anticipated injuries and illnesses (traumatic injury, respiratory extremis, toxidromes). Infectious disease physicians should be consulted for any infection suspected to be related to a biological attack. Allied health staffing should include operating room support staff, radiology, clinical laboratory services, pharmacology, infection control, and respiratory therapy. Because the results of laboratory assays and foreign material removed from victims may be potential evidence, medical personnel should understand that cooperation with local law enforcement and FBI officials is critical for evidence collection and the eventual prosecution of the perpetrators of these incidents.

Hospitals may develop a defined treatment policy (for victims and currently hospitalized patients) based upon their resource capabilities. Facilities should decide if they will perform both acute and definitive victim care or acute care only with the transfer of victims to specialized facilities distant from the local incident. Hospitals may choose to accept no acute victims and instead accept transfers of stable, hospitalized patients from other facilities to free up bed capacity for victims. Patient treatment and mobilization agreements must be clearly defined by contract and response plans between hospital agencies. Preplanned access to ancillary, off-site facilities (e.g., schools, hotels, public halls) may expand the capacity of a hospital; such facilities may be utilized to perform short-term observation for masses of asymptomatic victims.

### **Communications**

An organized and regimented system for external and internal communication is an important component of any disaster plan. External communications issues include the need to exchange information with local emergency management agencies and other health care facilities; disseminate standardized, non-sensational information sound bites for the local news media; act as a clearinghouse for victim identification and condition; and act as a public information source (public service announcements) about event-related issues (e.g., signs/symptoms, where to obtain medical care). Internal communications involve the need to communicate with employees concerning the nature of the event; implement the hospital disaster plan; activate the staff “call back” and rotation system to ensure adequate manpower; and provide critical incident stress debriefing for both personnel and their families.

### **Resource procurement and management**

Knowing the particular agent (chemical, biological, nuclear) and route of exposure (inhalation, ingestion, contact), hospitals may anticipate an increased need for specific facilities, supplies, equipment, and medical expertise. The hospital response plan

should include prearranged agreements with local industry/agencies, vendors, and other health care facilities for resupply and exchange of resources in the event of a WME attack.

Hospital resources may be conveniently divided into the following groups: facilities, supplies and pharmaceuticals (single-use items), equipment (multiple-use items), and manpower.

Facilities for the treatment and/or observation of victims may include traditional hospital settings or off-site ancillary settings. Nontraditional settings may include schools, meeting halls, and hotels. Specific areas of the hospital or external, contiguous locations should be designated for activities such as triage, decontamination, biological isolation, and short-term observation. Current physical plant facilities or rapidly deployable temporary facilities may be useful in managing large numbers of victims.

Because medical supplies, especially single-use items such as personal protective equipment, pharmaceuticals, antiseptics, and cleaners, will be in high demand, preemptive stockpiling of frequently used items may be helpful. Pharmaceutical companies, medical supply vendors, and hospital exchange contracts may allow for emergency reordering when demand is increased. Bulk reconstitution of specific pharmaceuticals or access to military stockpiles are other options that can prevent pharmaceutical shortfalls when large numbers of victims require treatment. Prearranged contracts and agreements with vendors and nearby military facilities may allow for an uninterrupted supply of medical care items.

Equipment that may be needed in increased numbers includes mechanical ventilators or respiratory assist devices, cardiac monitors, and portable radiography units. Hospitals must choose between prearranged contracts for procuring additional equipment or transferring victims to other hospital locations within nearby states or regions that have surplus equipment.

Medical personnel within the hospital may be trained and designated to respond to WME events. Personnel with key roles include, but are not limited to, physicians, nurses, respiratory and radiology technicians, safety and security officers, administrators, and public relations officers.

It should be recognized that ensuring the safety and security of the families of medical personnel may assume a high priority, since this may prevent hospital personnel from reporting for duty. Conservatively, it may be expected that 30% to 60% of hospital personnel may not report for work during an event. This loss of manpower may be experienced in the face of overload situations and extended operations.

Staffing shortfalls should be anticipated, and a “call back” or “rotating roster” system may be devised to ensure adequate numbers of personnel. Mechanisms to preemptively credential staff from the community (retired health care workers, students within the medical and allied health care fields), service agencies (American Red Cross, Salvation Army, visiting nurse agencies), other hospitals (those within geographic proximity or a multifacility health care network), and government agencies (National Disaster Medical Services) should be developed and operationalized.

### **DEVELOPING WME PROCEDURES AND DEPARTMENT-SPECIFIC RESPONSES**

PHHS has charged key departments with specific roles and responsibilities relative to these 5 critical functions. These de-

partments are emergency services, infection control, security and public safety, public relations and media, and pharmacy.

Emergency services personnel will likely make the first determination that a terrorist use of an agent has occurred. Knowledge of the general classes of agents, including their specific toxidromes, unusual clinical signs and symptoms, or unusual clusters of patients exhibiting similar signs and symptoms, should serve to alert clinicians to a potential event. Notification of hospital administration and a determination of the potential for disease spread must be made expeditiously. Triage and the need for decontamination or isolation are important early considerations. Emergency services personnel must maintain current knowledge of the initial stabilization and treatment of patients who have been exposed to the most likely chemical, biological, or radiologic agents. Data gathering on countywide hospital capacity, emergency transportation resources, hospital destination, hospital prearrival notification, and medical direction is one of the extremely important roles filled by BioTel, which resides within the Department of Emergency Services. Communications relative to area hospital capacity, patient destinations, and transport needs will be performed in cooperation with the joint information center within the City of Dallas Emergency Operations Center.

Infection control personnel are important in biological agent identification and may define and operationalize patient isolation needs. Epidemiologic principles should be used to detect the attack rate, source, and likely agent in cooperation with public health officials. Hospital isolation capacity, cohorting, and off-site observation facilities may require expansion. The facilitation of laboratory surveillance and testing are also key functions. Specific identification, isolation, and treatment protocols have been developed for the 4 biological agents considered most likely to be used by terrorists.

Security and public safety personnel may secure the hospital perimeter and limit facility access during an event. The maintenance of internal order and periodic security sweeps may be necessary to prevent unauthorized personnel from entering the facility. Ongoing interface with local and federal law enforcement agencies will promote complementary activities involving intelligence gathering, evidence collection, and investigative activities. The external decontamination facility is operated through the Department of Security and Public Safety with specially trained personnel. Members of the decontamination team drill periodically to maintain the requisite cognitive and psychomotor skills.

Public relations and media personnel may preemptively develop communications networks with local officials. Knowledgeable, predesignated spokespersons will schedule the delivery of timely, simple, accurate sound bites. As much as possible, the nature and detail of such media releases will be determined in advance. Communications will be performed in cooperation with the joint information center within the City of Dallas Emergency Operations Center. Public service announcements may report what has happened, signs and symptoms of exposure, appropriate self-care options, medical care options, and victim location assistance. Specific instructions on where victims should go to obtain triage and treatment, perhaps at novel locations, may lessen hospital burden. Coordination of specific announcements

from all medical facilities is a critical component to ensuring that a uniform message is delivered to the public.

Pharmacy personnel have preemptively determined the potential agents of exposure, the most efficient and effective treatment options, the duration of therapy, and prophylaxis and vaccination needs and anticipated the potential numbers of victims. Review of the current treatment standards and available generic equivalents will determine the most cost-effective manner for treating large numbers of exposed or infected individuals. The Pharmacy and Therapeutics Committee will regularly review these policies to ensure medical validity and currency with the standard of care. A cache of pharmaceuticals and pars (amounts) will be kept on hand for immediate use. Purchasing plans, funding streams, and inventory maintenance and control have been determined in advance. Additionally, a use and distribution plan, storage location, and restock mechanism are the responsibility of pharmacy personnel. Preemptive external agreements with drug wholesalers and companies will allow rapid resupply and limit pharmaceutical shortfall when large numbers of individuals require expedient treatment.

## SUMMARY

In Dallas, as in most metropolitan areas, the medical community is exceedingly complex. The health care community is fractionated into a bewildering array of providers including, among others, physician offices, clinics, urgent care centers, public health agencies, nursing agencies, and, of course, hospitals. In addition, the hospital community comprises a multitude of private and public facilities providing a range of services including basic medical/surgical care, acute/tertiary care, or special population (e.g., children, veterans) services. Such diversity and fractionation may act as a barrier in efforts to unify and organize the medical community's approach to WME events. Tenuous economics, competitive postures, and the absence of a single, controlling health care authority further dilute the medical community's sense of ownership and responsibility as it pertains to the management and mitigation of a WME event.

An analysis of the Dallas medical community revealed that there are 25 acute care hospitals with approximately 6300 beds (1999 American Hospital Association Guide, hospital listings). Less than 15% of hospitals within the greater Dallas-Fort Worth area have incorporated WME-specific planning, training, and treatment policies into facility disaster plans (Dallas-Fort Worth Hospital Council hospital survey, 1999). City planners, public health officials, and health care administrators have not developed a comprehensive, communitywide medical response plan. Such a plan should incorporate the resources of all facilities within the medical community. The entire medical community must commit to organized, widespread preparative efforts. As a public service and health resource, hospitals should acknowledge their responsibility to minimize morbidity and mortality within the community in which they reside. Hospital administrators and decision makers must prepare their facilities for the pivotal role they will play in the stabilization and treatment of victims, who may number in the thousands. Individual hospital characteristics, such as bed capacity, complexity of medical services, workforce sophistication, and mutual aid/contractual agreements, may be utilized to define the roles and responsibilities of specific fa-

cilities within the context of a WME event. If preparative efforts are not widespread and comprehensive, a single institution working in isolation will not significantly reduce community morbidity and mortality in the event of a WME incident.

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## Efforts of the Dallas–Fort Worth Hospital Council to prepare for bioterrorism

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Once the stuff of science fiction and disaster movies, the possibility of a terrorist attack against the USA using biological weapons is a grim reality as we enter the 21st century. Four years ago, terrorists unleashed sarin nerve gas on commuters in the Tokyo subway. More recently there has been a rash of anthrax hoaxes in the Los Angeles area. Intelligence experts and government officials, including President Clinton, have said it is a question of “when” not “if” a bioterrorist attack occurs. Discussing the possibility of a terrorist attack in the next few years, President Clinton has unequivocally stated, “This is not a cause for panic. It is cause for serious, deliberate, disciplined, long-term concern.”

A global threat assessment issued in December 2000 by the National Intelligence Council stated that the risk of a missile attack against the USA involving chemical, biological, or nuclear warheads is greater today than during most of the Cold War and will continue to grow in the next 15 years. The report also concluded that terrorist attacks against the USA through 2015 “will become increasingly sophisticated and designed to achieve mass casualties.” The most immediate threat comes from attacks using the weapons of mass destruction, such as chemical or biological weapons.

In the earlier days of the Cold War, civil defense was at the forefront of the nation’s consciousness. Public buildings were designated fallout shelters, and school children practiced “duck-and-cover” drills in the event of a nuclear attack from the former Soviet Union. According to a study reported last year in the *Journal of the American Medical Association (JAMA)*, hospitals and other health care facilities today are “poorly prepared” to handle a possible chemical or biological attack against civilian populations in the USA. The JAMA study researchers examined key elements of effective hospital response, including decontamination and triage, medical therapy, and coordination with public health agencies and emergency response personnel.

### HOSPITALS ON THE FRONTLINE

In contrast to conventional disasters, biological and chemical attacks shift a large portion of the burden away from police and firefighters to hospitals and health care workers. Such an attack is revealed when large numbers of people who are violently ill arrive at emergency rooms. Experts agree that the US public health and medical systems are not well prepared to rapidly detect and contain the spread of anthrax, smallpox, plague, or the

dozens of other possible agents not commonly seen by health professionals.

Jeffrey Koplan, MD, director of the US Centers for Disease Control and Prevention (CDC), has said, “A key issue is early detection. But our public health community’s [monitoring] system has lagged that of many other sectors.” In an effort to improve the system, over the last 2 years Congress has appropriated >\$275 million to the CDC for bioterrorism detection and response.

### LOCAL EFFORTS TO PREPARE

The Dallas–Fort Worth Hospital Council has taken the lead in addressing our community’s preparedness in what is now seen as the real possibility of a bioterrorist attack. Early last year, a core planning committee was established with approximately 30 officials from numerous local entities, including police and fire departments, departments of health, the poison control center, and hospitals, to develop a collaborative response plan for the Dallas–Fort Worth metroplex.

The goals of the committee, led by Ron Anderson, MD, of Parkland Memorial Hospital, were to understand the threat and potential impact of such an emergency on the community and to establish systems allowing medical facilities to share information, coordinate and identify needs, and manage patient load.

The first step taken by the committee was to survey hospitals in the Dallas–Fort Worth metroplex to determine their capabilities. The survey found that there are 970 intensive care unit beds, 1055 emergency department beds, and 800 ventilators available to treat victims of a bioterrorist attack. Of the 58 medical facilities that responded to the survey, 36 have the facilities to decontaminate patients who have been exposed to chemical or biological weapons. Assuming all of these facilities were operational and available, 1300 victims per hour could potentially be decontaminated.

The next step in the response planning process was the development of a comprehensive list of personnel who could assist in an emergency. Because the response is not limited to Dallas–Fort Worth, the list includes the Federal Bureau of Investigation (FBI), the Department of Health, the Department of Defense, and the Environmental Protection Agency, as well as local agencies such as fire and police departments. Within 48 hours of an attack, the federal government is expected to bring in medications that may not be immediately available locally. Officials from the state government would manage civilian population issues like temporary housing or transportation.

### A REAL-TIME COMMUNICATION LINK

According to John Gavras, executive director of the Dallas–Fort Worth Hospital Council, a critical component in ensuring a well-coordinated response to a bioterrorist attack is an effective communication system. An integral part of the work of the Dallas–Fort Worth Hospital Council is the development of a communication system, possibly Internet-based, to allow for real-time information exchange between hospitals and all other emergency responders.

Unlike conventional disasters, such as a plane crash or bus accident, victims of a bioterrorist attack must be evaluated prior to allowing a massive influx of contaminated patients into the